

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
1 July 2004 (01.07.2004)

PCT

(10) International Publication Number
WO 2004/055823 A3

(51) International Patent Classification⁷: G11C 11/16, 7/24

(21) International Application Number:

PCT/IB2003/005999

(22) International Filing Date:

15 December 2003 (15.12.2003)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

60/434,520	18 December 2002 (18.12.2002)	US
60/434,829	18 December 2002 (18.12.2002)	US
60/439,986	14 January 2003 (14.01.2003)	US
03100403.9	20 February 2003 (20.02.2003)	EP

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(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

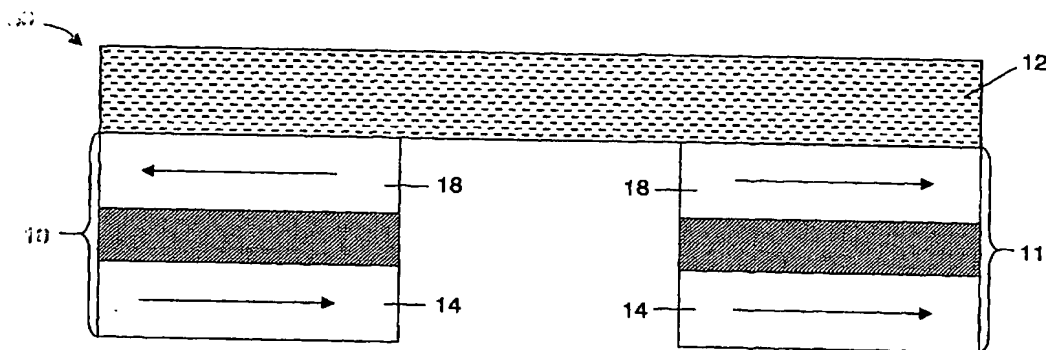
(84) Designated States (regional): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ,

[Continued on next page]

(54) Title: HARDWARE SECURITY DEVICE FOR MAGNETIC MEMORY CELLS



(57) Abstract: The present invention provides a special structure of magnetic elements, e.g. MRAM elements (10, 11), as a security device (30) for IC's containing magnetic memory cells. The structure may comprise a combination of two or more associated magnetic elements (10, 11) with pre-set anti-parallel magnetization directions. By determining the polarisation directions of the magnetic elements, exposure to an external magnetic field can be detected. Inverse polarisation directions indicate a normal situation, aligned polarisation directions indicate that the MRAM-array has been exposed to an external field. In this way it can be detected whether it has been tried to erase or alter the data stored in the MRAM in an illegal way. The IC can regularly check the resistance of the security system during operation. Upon detection of a field exposure, the IC can erase all MRAM data, or can reset itself or block its functioning.

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TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

Published:

— with international search report

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
14 April 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

PCT/IB 03/05999

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G11C11/16 G11C7/24

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G11C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 014, no. 249 (P-1053), 28 May 1990 (1990-05-28) & JP 02 066479 A (NEC CORP), 6 March 1990 (1990-03-06) abstract	1-6,8-12
A	US 2001/033012 A1 (KOEMMERLING OLIVER ET AL) 25 October 2001 (2001-10-25) paragraph '0097! - paragraph '0117! paragraph '0218! - paragraph '0219!	1-12

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☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

11 February 2005

Date of mailing of the international search report

21/02/2005

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INTERNATIONAL SEARCH REPORT

PCT/IB 03/05999

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